Agricultural Chemical Safety Assessment: An Improved Toxicology Testing Paradigm

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Environmental Issue

The protection of human health is the primary goal in the safety assessment and registration process for pesticides. The current approach to evaluating pesticides was put in place many years ago—the design of which has not changed in decades, although our knowledge about toxicology and disease has progressed. There is an increasing complexity and sophistication of science considerations called for in human health assessment today (e.g., an understanding of mechanisms of toxicities, susceptibility of life stages). Thus, it is important to improve the current approach to evaluating the potential health effects of chemicals, particularly in the face of restricted resources.

Scientific Approach

To address this need, the Health and Environmental Sciences Institute (HESI) convened a large group of international experts from industry, academia, and government (including several scientists from the U.S. Environmental Protection Agency [U.S. EPA]) to develop a credible and viable testing approach that could be implemented today and that would make the assessment process more accurate and efficient, with fewer animals and artifacts. From the outset of this endeavor, it was unanimously agreed that a tiered approach should be developed that incorporated existing knowledge on the chemistry, toxicology, and exposure of the compound and that integrated testing on metabolism, life stages, and systemic toxicities. Three international task forces were charged with designing study types and endpoints on metabolism, life stages, and systemic toxicities to be used in this tier-wise approach. For each task force, two co-chairs—one from industry and one from the U.S. EPA or academia—were identified. This tiered approach departs from the current “check box” scheme used by many national authorities and represents the first comprehensive effort of its kind to redesign the testing framework for agricultural chemicals.

Partnerships

• HESI, a global branch of the International Life Sciences Institute
• Industry (BASF, Bayer CropScience, Dow AgroSciences, DuPont Crop Protection, Monsanto, Syngenta)
• Academia (Imperial College London, Johns Hopkins University, Medical College of Wisconsin, Michigan State University, Mississippi State University, Universiti di Padua, University of California Riverside, University of Nottingham, University of Southampton)
• International Government (European Commission, European Food Safety Authority, German Federal Institute for Risk Assessment, Health Canada, OECD, Dutch RIVM)

Impact
In keeping pace with emerging science, the U.S. EPA's Office of Pesticide Programs is currently considering the ACSA tiered-testing approach, as well as other available proposals on toxicology testing, to determine its next generation of revisions to current data requirements and testing guidelines.